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## Contingency planning and prioritising pest plants

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Weed control is an emotive issue and all land managers have to deal with it, often with limited funds. Land managers, however, are usually motivated to prioritise control of weeds having an obvious impact on their use of the land, for example those that are already well established and abundant. Recently, an increasing focus has been given to preventing weed spread early in the invasion process, that is, by attempting to eradicate particular species long before they expand and become widespread. Land managers need to identify the present and future priority weeds so that resources can be focused on them. This paper describes a generic process or contingency plan to assist in developing either local, regional or state plans to identify and act upon new and emerging pest plants. (*The Victorian Naturalist*, **124** (2), 2007, 83–86)

### Introduction

Preventing the naturalisation of potentially invasive species is accepted as the first and most cost-effective option for dealing with biological invasions (Wittenberg and Cock 2001). Moreover, economic modelling suggests that preventing the spread of new pests can generate a benefit-cost ratio of up to 38:1, far exceeding most other forms of government investment (AEC group 2002).

Currently, it is estimated that at least 27 009 non-native plant species have been imported into Australia (Virtue *et al.* 2004). While it is difficult to predict how many of these will become invasive, nearly 8000 have documented histories as invasive species somewhere in the world and over 3000 of these already have naturalised somewhere in Australia (Randall 2006). It is possible that tomorrow's weeds, potentially over 4900 species, are being sold as garden plants right now.

### Recent (1970 – 1995) plant introductions into Victoria

A total of 135 new vascular plant species were recorded as introduced into Victoria between 1970 and 1995. The number naturalising per year is shown in Fig. 1 and a regression indicates that the rate of new introductions is increasing, with the present average of 7.3 new plants establishing per year with an annual increase of 0.25 plants each year. Predominantly these new plants have originated from South Africa and Europe, and have been introduced deliberately as ornamental plants. The most common new invaders into Victoria are from the families Iridaceae and Poaceae in the Monocots; Salicaceae, Fabaceae, Asteraceae and Malaceae in the Dicots; and Pinaceae in the Conifer group (Groves and Hosking 1997).

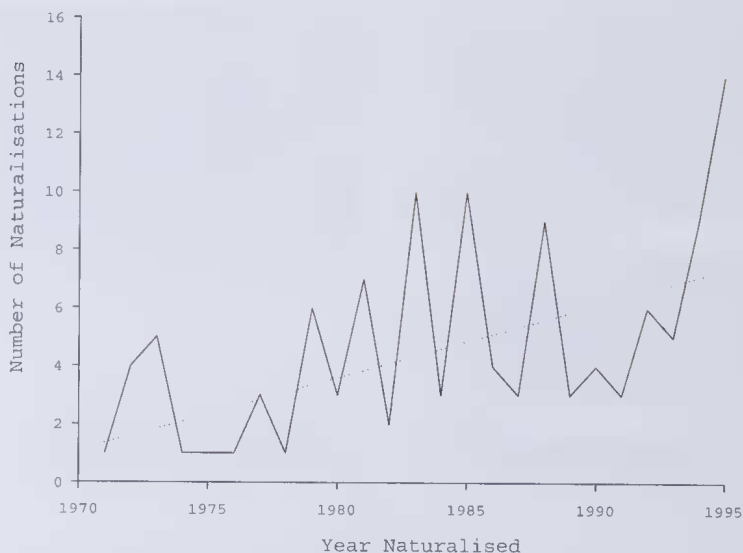


Fig. 1. Number of new plant species naturalised in Victoria, 1970-1995, and linear regression (dotted line) indicating the rate of naturalisations.

The procedures presently being implemented by AQIS hopefully will prevent the introduction and release of many new weeds in Australia and Victoria. However, new weed problems would still arise in the future from several sources, including:

- invasive plants that continue to penetrate current or improved protocols for the introduction and release of potential weeds (e.g. plants may be considered benign but become weedy nevertheless);
- invasive plants that are introduced accidentally (e.g. as contaminants of imported seed);
- invasive plants already in Australia that assume major significance as weeds due to changes in environmental conditions (e.g. flood or fire) or other factors (e.g. climate change); and
- translocated native species.

### Contingency plan

An early warning and contingency plan needs to have many separate systems with well defined protocols and procedures as well as defined roles and responsibilities of the key players. The strategy should include:

- a system to highlight new or potential weeds, which may need action;

- a system to identify;
- a system to assess risk;
- a notification system;
- a process to ensure a plan of action is developed;
- a process to implement and review the plan.

Waterhouse and Corlett (1996) indicated a similar procedure. Whenever a new (escaping or naturalised) alien species is recorded by any of the State herbaria:

1. Convey the details promptly to the appropriate 'designated authority' (e.g. Department of Natural Resources or Department of Agriculture).
2. Conduct a literature review to determine whether the species has been documented as a weed elsewhere.
3. Investigate the known native and exotic distributions and predict the potential Australian distribution.
4. Perform a weed risk analysis to determine whether it is likely to be a weed of any significance.
5. Recommend and implement actions as necessary. This may range from maintaining a 'watching brief' on the weed's distribution and invasiveness through localised control efforts to a full-scale eradication program.

6. Notify interstate 'designated authorities' of all new weeds, and keep them informed throughout the assessment process.

The process should not be halted at Step 2 if the literature review fails to reveal previous documentation as a weed, otherwise invasive species such as *Praxelis clematidea* will continue to be overlooked.

The Victorian Departments of Sustainability and Environment (DSE) and Primary Industries (DPI) instigated a Weed Alert and Rapid Response Plan in 2005 that implements a surveillance and response plan for potential new and emerging weeds in Victoria (DPI 2005).

### Early Detection

Procedures are necessary to ensure that any new weeds are detected as early as possible. Early detection requires community awareness coupled with strategic monitoring; collections are encouraged as relatively few people collect weedy species and submit them.

An effective awareness program would lead land managers and users to recognise how important it is to call attention to any new plants appearing in their locality. The need for an awareness program is recognised in the Australian National Weeds Strategy (1999).

As distinguishing between indigenous and introduced flora is difficult, monitoring is required in native vegetation. Such surveys should determine hazard site selection or target areas that are prone to invasion (e.g. disturbed sites, roadsides and waterways), and possibly remote reserves where weed invasions could otherwise go undetected for a long time.

As predicting problematic plants is difficult, all introduced plants in native vegetation should be subject to field surveys, particularly with the anticipated change in weed distribution and impact associated with global warming forecasts. DSE and DPI are not sufficiently funded to routinely survey introduced species, although the need is recognised.

### Identification and Reporting

Detection of potential problems must be supported by a readily accessible identification and reporting mechanism. The Australian National Weeds Strategy proposes that formal procedures should be

developed with the following purposes:

1. All interested individuals will know where plants new to a particular area can be sent for identification.
2. Potential weeds submitted by individuals will be determined to be either:
  - plants previously recorded in the particular state or Territory or region/catchment from where they were submitted, or
  - plants not previously recorded in the particular State or Territory or region/catchment but recorded elsewhere in Australia, or
  - plants not previously recorded in Australia.
3. Agencies to which such plants are sent (National and State herbaria and government agencies with botanical expertise) will report plants new to an area to relevant weed control authorities.
4. Weed control authorities can rapidly assess the weed potential and significance of the new plant and make an appropriate response.

Plant identification and reporting mechanisms should be well coordinated across Australia. A compatible protocol should be implemented in Victoria, however the National Herbarium of Victoria is not currently funded specifically to collect or describe introduced species.

### Assessment

The national post-border weed risk management protocol (Anon 2006) has been published recently to foster the use, standardisation and further development of decision support systems for prioritising weed species for management at different scales (Virtue and Panetta 2006)

With the limited amount of funding available to pest plant management, an assessment procedure has to be able to compare the relative importance of existing and of new and emerging weed problems. To accurately assess any plant requires using a combination of scientific data and expert knowledge. The problem is how to integrate human judgements with quantitative assessment techniques. The Analytical Hierarchy Process (AHP) is a Multiple Criteria Analysis technique which addresses this problem. Complex issues can be broken down into a set of related criteria. This systematic process is a 'divide and conquer' approach to problem solving. It is used

across many problem domains. By mapping out issues as a set of nested criteria, a decision hierarchy can be developed. The process also allows for relative importance or weight to be applied to each criterion and group. The DSS is a multi-layered system that rests on a database layer containing spatial data and tabular data from the departmental corporate database.

Victoria's Pest Plant Assessment project at DPI – Frankston has established a procedure to assess and prioritise any plant on its intrinsic abilities to invade suitable ecosystems and its present and potential impacts on social, environmental or agricultural land use. This procedure utilises the AHP of a Decision Support System.

The assessment procedure is split into three main parts: a scoring system which analyses a plant's intrinsic invasiveness characteristics, and production of the present distribution and potential distribution (utilising climate modelling programs). This distribution is then linked to a geospatial information database enabling impacts to be estimated on social, environmental or agricultural resource bases. A separate economic model is incorporated into the system which estimates the potential benefit in controlling these weeds on public or private land.

Thus any plant can be assessed for its relative importance compared to other weeds based on its intrinsic ability to invade (or rate of spread), its present and potential

distribution and its Victorian social, economic and environmental impacts.

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## One Hundred and One Years Ago

### NOTES ON THE RUSTS OF AUSTRALIA

By D. M<sup>c</sup>Alpine, Government Vegetable Pathologist

(Excerpt from a paper read before the Field Naturalists Club of Victoria, 9<sup>th</sup> April 1906.)

*Miscellaneous.*— There are some interesting points in connection with certain species of rusts which are worthy of special mention. There is a rust found on the Marigold, which is a well-known imported plant, and it is only known at present in Australia, so that the question is raised whether the Marigold, since its introduction, has become subject to a native rust, or has the rust found upon it been overlooked in the Old World?

From *The Victorian Naturalist*, 23, p 51, June 1906